

### **2.3 Analysis of Intersection Improvements**

Based on the results of the intersection delay studies conducted for each corridor, intersections were identified where individual approaches of the intersection operate at LOS 'D' or worse. These intersections were further analyzed to determine if traffic operations for the individual approaches and/or the overall intersection would benefit from minor improvements in lane configuration (i.e.-adding right-turn or left-turn lanes) and/or signal phasing (i.e.-adding or removing permitted/protected phasing). Consideration was also given as to whether any minor improvements would be physically and economically practical and/or feasible. Analyses of potential improvements were performed using Synchro, a nationally accepted computer software package incorporating the methodologies of the 2000 HCM.

#### *North 27<sup>th</sup> Street/Holdrege Street*

This intersection currently operates at or near LOS 'D' during both the AM and PM Peak time periods. The northbound and southbound approaches operate at or near LOS 'D' during the AM Peak, and the eastbound and westbound approaches operate at or near LOS 'D' during all three peak time periods.

Analysis of the intersection using Synchro indicates that the northbound and southbound approaches could benefit from the addition of right-turn lanes. Computer analysis of the AM Peak time period, which experiences the highest level of delay of the three peak time periods, indicates that with these two right-turn lanes, an improvement in overall delay from 29.6 veh/sec to 25.4 veh/sec, with a corresponding improvement in the volume-to-capacity ratio (V/C) from 0.84 to 0.76 would result. The southbound approach improves from 24.9 veh/sec (LOS 'C') to 16.0 sec/veh (LOS 'B') and the northbound approach improves from 15.9 veh/sec to 12.6 veh/sec. However, existing right-of-way constraints near both the northbound and southbound approaches make these improvements difficult to implement.

Both the eastbound and westbound approaches also experience relatively high average delay and decreased LOS. However, decreased efficiency in traffic operations are primarily due to unbalanced lane utilization and "bottlenecks" created by merging lanes of traffic downstream of both approaches.

#### *North 27<sup>th</sup> Street/Superior Street*

This intersection is characterized by high traffic volumes, especially during the three peak time periods, dual left-turn lanes on the northbound, eastbound and westbound approaches with protected signal phasing and exclusive right-turn lanes on the eastbound and westbound approaches. Therefore, very few possibilities for minor improvements exist based on these existing characteristics.

#### *North 48<sup>th</sup> Street/Vine Street*

“After” intersection delay studies indicate that this intersection operates relatively efficiently (LOS ‘C’) during both the AM Peak and Midday time periods. However, the overall intersection operates at LOS ‘D’ during the PM Peak time period, with the eastbound and westbound approaches operating at LOS ‘D’ or worse. To improve operations for both of these approaches and the overall intersection, additional right-turn lanes are suggested for the northbound, eastbound and westbound approaches. Synchro analysis indicates that these improvements would decrease overall delay during the PM Peak from 37.2 sec/veh to 30.8 sec/veh, with the V/C ratio decreasing from 0.87 to 0.79. However, due to close proximity of businesses to each of these approaches, careful consideration should be given to the assessment of the potential benefits of these improvements versus the cost of acquiring the necessary right-of-way required for implementation.

#### *North 48<sup>th</sup> Street/Leighton Avenue*

Although this intersection operates fairly efficiently during all three peak time periods, the westbound approach experiences relatively high average delay and low LOS. Currently, the westbound approach provides only one lane of traffic to service all westbound vehicles. The addition of a left-turn lane is recommended to allow more vehicles to be serviced under the current signal timing and phasing of the intersection. By providing this additional lane, analysis of the intersection for the AM Peak indicates that average delay for the westbound approach would decrease from 55.3 sec/veh (LOS ‘E’) to 42.9 sec/veh (LOS ‘D’). With this additional lane, the overall intersection delay would improve from 30.9 sec/veh to 28.3 sec/veh.

#### *North 70<sup>th</sup> Street/Adams Street*

This intersection operates at LOS ‘C’ or better during all three time periods. However, the eastbound approach operates at LOS ‘D’ during the PM Peak. An additional lane for left-turning vehicles is recommended for the eastbound approach to alleviate vehicle delay and improve safety at the intersection. According to Synchro analysis, the addition of an eastbound left-turn lane would improve average eastbound approach delay during the PM Peak from 27.2 sec/veh to 19.8 sec/veh and overall intersection delay from 15.5 sec/veh to 14.0 sec/veh. V/C ratio would also improve from 0.71 to 0.67. However, difficulties may arise in acquiring the necessary right-of-way based on the close proximity of the approach to a nearby gas station/convenience store.

#### *Nebraska Highway 2/Old Cheney Road*

At this intersection, the eastbound approach on Old Cheney Road experiences significant delay and decreased LOS during both the AM Peak and Midday time periods. At present, Old Cheney Road is a two-lane roadway north/east of Nebraska Highway 2. Future construction schedules indicate that this roadway will be widened to accommodate two lanes of traffic in each direction. Currently, the eastbound approach on Old Cheney Road provides a left-turn lane, a through lane and a right-turn lane. With the completion of construction on Old Cheney Road north of Nebraska Highway 2, it is recommended

that the eastbound approach be converted from the existing configuration to a left-turn lane, through lane and a shared through/right-turn lane. According to Synchro, this would improve average delay for the approach from 70.0 sec/veh (LOS 'E') to 52.7 sec/veh (LOS 'D') during the AM Peak time period. Also, due a relatively high volume of vehicles making a southbound left-turn from Highway 2 onto Old Cheney Road, permitted/protected phasing is also suggested for the southbound approach on Nebraska Highway 2.

#### *56<sup>th</sup> Street/Vine Street*

Intersection delay studies conducted at this intersection indicate that the overall intersection operates at LOS 'C' or better. However, the studies also indicated that the westbound approach operates at LOS 'D' during the PM Peak time period. Future, scheduled improvements at this intersection, which include adding eastbound and westbound left-turn lanes, are scheduled to be complete by the end of year 2001. Based on planned improvements at the intersection, which will have a positive effect on traffic operations, no other minor improvements are being recommended at this time.

#### *33<sup>rd</sup> Street/Vine Street*

This intersection is located within a residential area near Hartley Elementary School. Intersection delay studies indicate that this intersection operates at LOS 'C' or better during all three time periods. However, the southbound approach does experience increased averaged delay and diminished LOS during both the AM and PM Peak time periods. Permitted/protected phasing is suggested for both the northbound and southbound approaches. Although computer analysis does not indicate any significant improvement in delay for the intersection or either of the approaches, the change in phasing has the potential to increase safety for both motorists and pedestrians utilizing the intersection.

Several other intersections with approaches operating at LOS 'D' or worse were also identified. However, further analysis and investigation of these locations did not reveal any potential minor improvements that would benefit or improve the operation of the intersection.